

Walkability, Pedestrian Infrastructure, & Transit Access in Atlanta

A Case Study on Ashby, Inman Park/Reynoldstown, and Lindbergh MARTA Stations

Graduation Option Paper
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Figure 1: Lindbergh City Center Station *(Source: Author's own image)*

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Abstract

This paper focuses on the complex relationship between walkability and transit access in Atlanta. The following is a case study between three stations of the Metropolitan Atlanta Rapid Transit Authority heavy rail line that are of near equal distance from Downtown Atlanta and will compare and contrast the current pedestrian infrastructure conditions surrounding the stations. Recommendations from the findings will be stated at the end of this paper.

Introduction

Public transportation is an ever-increasing key ingredient to the fluidity of cities and the people who reside within them in today's increasing mobile society. Although public transit has for more than a century been a prime choice of travel in a few select dense American cities, it is quickly becoming an important mode of travel in many more emerging cities and regions in the United States. After decades of migration to the suburbs, many American cities, such as the capital city of Atlanta, Georgia, are increasingly experiencing the negative effects of large-scale urban sprawl. Heavy gridlock traffic, poor air quality, and skyrocketing land prices are all currently taking a toll on Atlanta's population as many struggle to move throughout the region in a timely manner. Public transportation entities like the Metropolitan Atlanta Rapid Transit Authority, or more commonly referred to as MARTA, are one mode of travel that many are beginning to turn to in the daily struggle to reach destinations related to work, recreation, and travel. Besides driving (many stations offer no free or paid parking options), public transportation is often accessed by either

walking or riding a bicycle to a bus stop or rail station. Many transit facilities are unfortunately lacking the necessary pedestrian infrastructure and access points to fully utilize this mode of access to its networks. Why is this important?

A major driving point behind this problem with a lack of appropriate pedestrian infrastructure and access are the impacts that this lack of access has on its location.

Walkability is concept that is hard to define but one that most everyone is familiar with when they think about the word. According to

Walkable Communities, Inc., a major source of information regarding the concept, walkability is “the cornerstone and key to an urban area’s efficient ground transportation.... Walking remains the cheapest form of transportation to all people. Construction of a walkable

community provides the most affordable and

equitable transportation system any community can plan, design, build, and maintain.”

(Walkable Communities, Inc. 2016) Walkability is about connection between places, people, and ideas. The ease of travel between points A and B is a key driver to not only transportation, but also to jobs, public health, and financial stability. Connectivity to public transit, especially in areas of lower incomes, is especially key to the economics of an area as no access to jobs can lead to lower earned incomes on average.

The purpose of this paper is to not only identify problem areas surrounding specific public transit stations in regards to walkability and pedestrian access, but also to highlight



Figure 2: Lindbergh City Center
(Source: Author's own image)

key measures and practices to remedy these issues. With recommendations come funding concerns, regulation, neighborhood consensus problems, and overall length of time that many of these recommendations take to be implemented. Nothing can be accomplished however if enough traction is gained behind an idea and the needs of everyone are put before the wants of a few.

Walkability & Public Transportation – A Literature Review

Before discussing the current conditions of the stations in this case study, a quick literature review of what has already been researched in this area will follow to give context to this problem that is far from new.

Walkability

Walkability is the ease of which a pedestrian is able to access a particular destination or set of destinations. Walkability is an important factor to the overall health of our neighborhoods, cities, and society as a whole. According to Madnuson and Mirman, conditions surrounding our homes and neighborhoods can have major health impacts (Magnuson and Mirman 2011). They specifically discuss how physical characteristics of the neighborhood can affect health by limiting easy access of people (especially those with lower incomes) to grocery stores, parks, and to better, high paying jobs. They argue that these physical features of places can affect both physical and mental health and are also capable of leading to an increase in health problems if not properly maintained and installed. According to the authors, one-fifth of Americans live in “poor” neighborhoods that have contain below average physical structure and access points.

This leads to the question of how to we achieve better walkability and how much does an increase in walkability actually show up in an economic area. According to Litman, walking and walkability in a neighborhood or city can provide many benefits to the society as a whole, such as with mobility rates, consumer cost savings, livability, fitness, health, equity, and efficient use of land and property (Litman 2014). He argues that walking is undervalued in our society because it is a low cost method that is often associated with lower classes in society (possibly because they cannot afford to own a private vehicle) and that its benefits are largely ignored. He argues that these values need to be more widely considered when funding for projects occurs, as even though it may just be a sidewalk or bike lane that does not generate direct cash flow, they lead to a decrease in congestion, pollution, and higher health rates in that particular community, which causes a ripple effect of benefits to others as well.

Public Transit

Public Transportation connects people and ideas together and allows movement across space easily so communities are able to access jobs, recreation, and retail. Public transportation is also an important driver in land values across a region. Anas and Armstrong wrote about how land values were directly impacted by infrastructure investments along transportation corridors in the New York Metropolitan Area and how the area itself directly handled those fluctuating values and how they impacted the residents of that region (Anas and Armstrong 1993). Similarly in Atlanta, much has been written on the relationship of Transit, TODs, and property values. Lambert wrote about how the property values at the Ashby station tended to decrease within a half-mile radius from the station but tended to increase again the further outside that

radius one got (Lambert 2009). This contrasted with other stations in the region that showed an increase in land values the closer to the stations, such as at Lindbergh or Sandy Springs.

Guides from the past should also be taken into consideration when planning for transit throughout our cities. Ross discusses the key targets of implementation on a transit project in the study in Hall County, GA and how those infrastructure developments can lead to an increase in walkability, mobility, and access in that area (Ross 2006). Those highlights can be taken and further used on another project. Smith also discusses how MARTA developments should be oriented towards the furthering development of the transit system and how that transit system has to in turn be oriented toward the areas that it is developing within (Smith 1992). Comparisons of one transit system to another is another useful tool to further develop a transit project- see what works in one place and what doesn't, such as in von dem Knesebeck's study on the comparisons between the US and German transit systems (von dem Knesebeck 2011). What works in Germany, such as their practicality, efficiency, and vast scope of service, could possibly be pulled into future plans for a US transit system, such as MARTA, especially when digesting their means of funding and support.

Transit and the Pedestrian Environment

Pedestrian environment is the bridge between transit and walkability. Much has been written regarding how that environment can play a large impact on ridership of that transit facility. Ryan and Frank did a study on this very same phenomenon in regards to the physical state of the walking and biking environment and the ridership numbers it had on the bus system in San Diego, CA (Ryan and Frank 2009). Their data types and sources stemmed from bus ridership, transit level of service, built environment, and socio-economic factors. From

these factors, a walking index was created and used to justify certain recommendations for a better-built environment for pedestrians. Other studies of this nature have been done, such as by Park, Choi, and Lee regarding how the choice to walk is affected by the environment or by other similar external factors (Park, Choi and Lee 2014). This study looked into the behavior of pedestrians in Mountain View, CA and worked to create a survey and model to predict walkability rates based off certain built characteristics of the environment.

Walkability and Transit in Atlanta

Within the operating shadow of MARTA and the city of Atlanta, several walkability and transit studies have been done. Bollinger discusses the actual impact that MARTA has on station area development (Bollinger 1997). He states in his study that MARTA has not had a significant impact, either positively or negatively, on the built environment or total population numbers in or around their station areas. Depending on the station, different results have surfaced. MARTA has definitely brought in more public sector jobs to the areas that they have built stations however, which may or may not have an impact on the environment for pedestrians. Ozbil wrote in their study that MARTA ridership is indeed affected by the built environment, and is the affecting factors are street connectivity, station location, walking distances, and land-use/population density (Ozbil 2010). These four factors are what most impact the ridership numbers from those who walk or bike to the stations.



Figure 3: Lindbergh City Center
(Source: Author's own image)

Atlanta and MARTA

For this case study, three stations on the heavy-rail line of MARTA will be highlighted intensely. Though all three of these stations currently lie within the Atlanta city limits and Fulton County, certain aspects of the study will look at regional efforts in transportation planning. The core five counties of the Atlanta Metropolitan Area are mapped out in Figure 4 with the city limits highlighted in dark brown. The main regional interstates are highlighted in white while the rail lines of MARTA are shown in blue. Demographic breakdown of area data and trends are as follows.

According to the Atlanta, GA Census Data (2010), the city itself currently has a population of 420,003 with a median age of 32.9. The racial make up of the city is currently 54%

Black/African American, 38.4% White, 3.1% Asian, with 6% other.

The percent of people who identify as Hispanic or Latino is 5.2%. Atlanta currently has a home vacancy rate of 17.6% and an unemployment rate of 6.3% as of 2015 (United States Census Bureau 2010).

The history of the Atlanta's public transportation infrastructure is vividly described in *Martin's Mule to MARTA* in which he breaks down the entire timeline of transportation in the

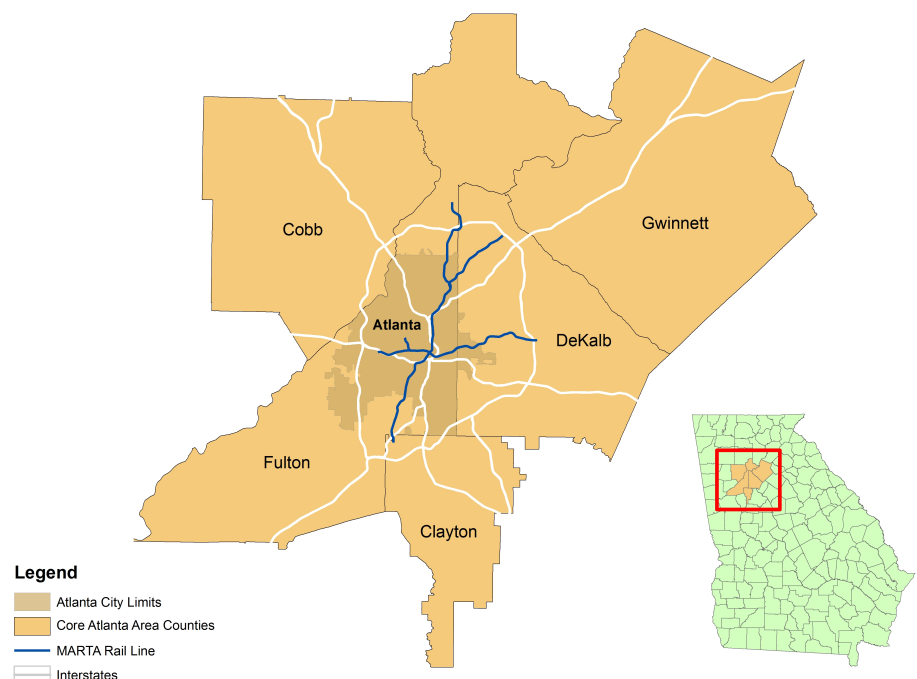


Figure 4: Atlanta Metropolitan Area
(Source: Author's own image)

emerging Atlanta region in the 1800's as a railway hub for North Georgia, through the history of the streetcar and its expansion out into the suburbs (such as Inman Park), up to the creation of MARTA in the 1960's (Martin 1975). According to Anbinder (2014), MARTA was intended to cover a five county area but was only approved by two, DeKalb and Fulton Counties (which contain the city of Atlanta). Many reasons were stated for the rejection of this service, but many believe today that much of the dissention was due to racial politics and tension during that time period and that the overwhelmingly white affluent suburban counties did not want to give minorities easier access into their neighborhoods. MARTA was created in the two core counties and eventually grew into the modern day four-line East-West heavy rail system supplemented by bus service to the outskirts of Fulton and DeKalb. MARTA expanded to three counties when Clayton County to the south voted to join the system in the mid 2010's. As of 2014, MARTA averages over 430,000 daily riders across its network of trains, buses, and streetcars, which has led to an annual ridership of 135 million people (Metropolitan Rapid Transit Authority 2011).

Regional Plans

The following sections highlight a few of the many regional plans in and around Atlanta that pertain to either pedestrian/bicycle movement or access.

Bike Atlanta

There are many regional plans throughout the Atlanta area that pertain to walking and biking. Bike Atlanta, also referred to as the Atlanta Bicycle Coalition, is one such group that is leading the way in bicycle advocacy for more bike lanes, facilities, and increasing the safety of all who partake in those activities. They are also part of various plans to take back the streets, such as Atlanta Streets Alive festivals where entire streets are shut down for a day

and can be used for vendors, artists, and for regular recreation such as biking and walking. In Figure 5 above, bicycle inventory in the Atlanta region is shown, both for the year 2007 as well as the year 2014, highlighting the growth of the network. The most growth is primarily seen in the city of Atlanta, North Fulton, Cobb County, and portions of western Gwinnett County. Areas that are lacking these investments appear to be a majority of DeKalb County (besides the infrastructure and trails that exist to connect Atlanta to Stone Mountain), Clayton County, as well as southern Fulton County. It is encouraging however

**Bicycle Facility Inventory
as of 2014**

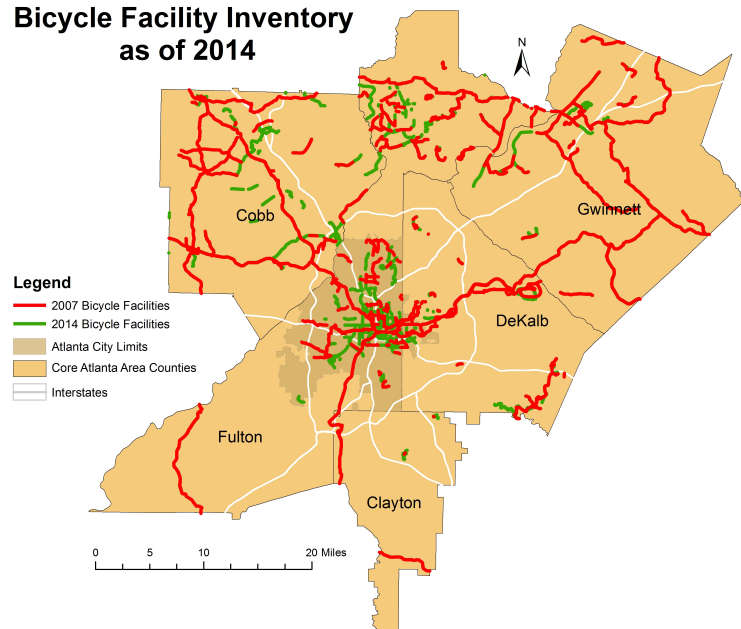


Figure 5: Atlanta Region Bicycle Inventory
(Source: Atlanta Regional Commission data, Author's own image)

to see the growth taking place in the more urban areas of the region. (Atlanta Bicycle Coalition 2016)

Atlanta BeltLine

The Atlanta BeltLine is a project that first began to be discussed after the 1999 master's thesis by Georgia Tech City Planning student Ryan Gravel. The BeltLine is a series

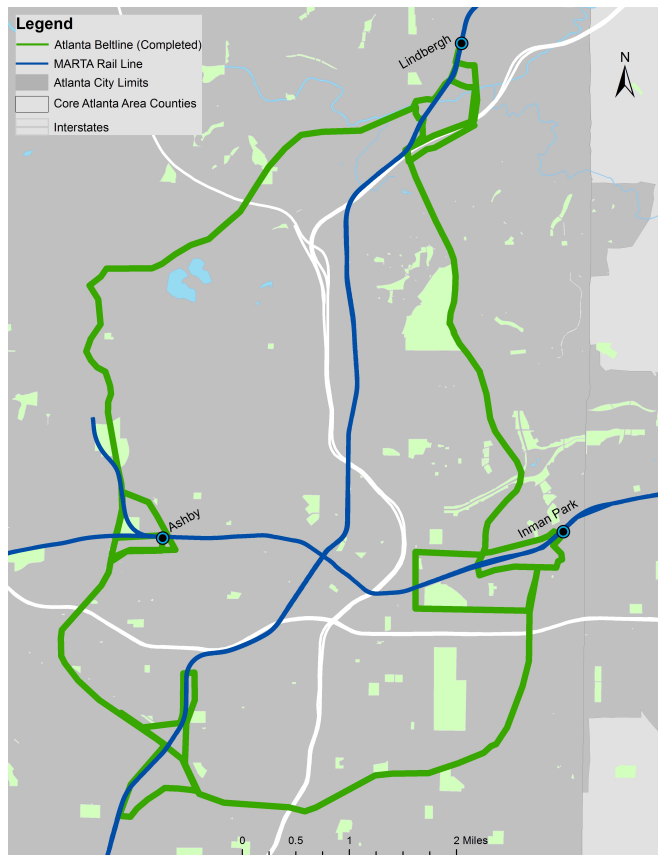


Figure 6: Atlanta BeltLine (Source: Author's own image)

of trails that will eventually be connected to form a 22-mile loop around Downtown Atlanta. Portions of the trail have already been opened, most notably the Eastside and Westside trails, which have proved to be extremely popular with bikers and pedestrians. The trails themselves are being built upon what was once a series of freight rail lines that circled the city that have long been abandoned. The idea is that once the BeltLine is completed,

they will not only serve as a pedestrian

connection around Downtown but will also share the corridor with light rail transit vehicles that will connect into the streetcar network being built. The BeltLine is important to this study because it just so happens that the trail itself will connect perfectly with all three stations being analyzed, allowing for a definite increase in pedestrian connectivity to and from the stations themselves. This improving connectivity will funnel more riders to

the stations themselves, which means that this pedestrian infrastructure in place by MARTA needs to be all the more pedestrian friendly and welcoming to those who will use the station to access the BeltLine and all the locations and neighborhoods that it will connect to. (Atlanta BeltLine 2016)

Atlanta Streetcar

With the Atlanta BeltLine will come the expansion of the Atlanta Streetcar network, which will operate as light rail throughout certain corridors. Figure 7 below shows what the network could one day look like if the appropriate funding is secured and the right of

ways cleared and built up (Image of Atlanta Streetcar Map 2016). The idea is to connect from the Downtown and Midtown rail stations outwards to the BeltLine, along with many other connections snaking through town between the two. This idea is working towards connectivity within the city for those who prefer to bike or walk to work and not have to solely rely on cars. While MARTA's heavy rail does allow for some long distance movement with your

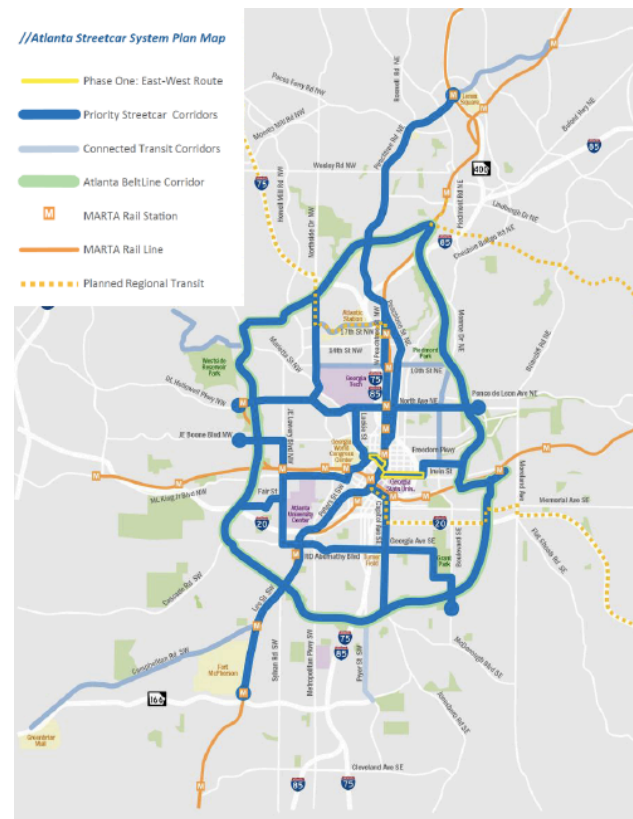


Figure 7: Atlanta Streetcar Future Network
(Source: Atlanta Streetcar)

bicycle or by foot, there are still many areas of the city that are hard to reach without many transfer or long bus rides stuck within congestion. The rail line along the BeltLine, which

again connects with Ashby, Inman Park, and Lindbergh Stations, will help alleviate that movement which is difficult today.

Station/Neighborhood Profiles

This case study involves analysis of three MARTA Stations. Ashby Station is first, which lies three stops west from Five Points Station along the Blue and Green lines and is located on the western side of Downtown and serves areas such as the Atlanta University Center, Martin Luther King Jr. Blvd, and Joseph E Lowery Ave. Inman Park / Reynoldstown Station is next, which is located three stops to the east of Five Points Station also

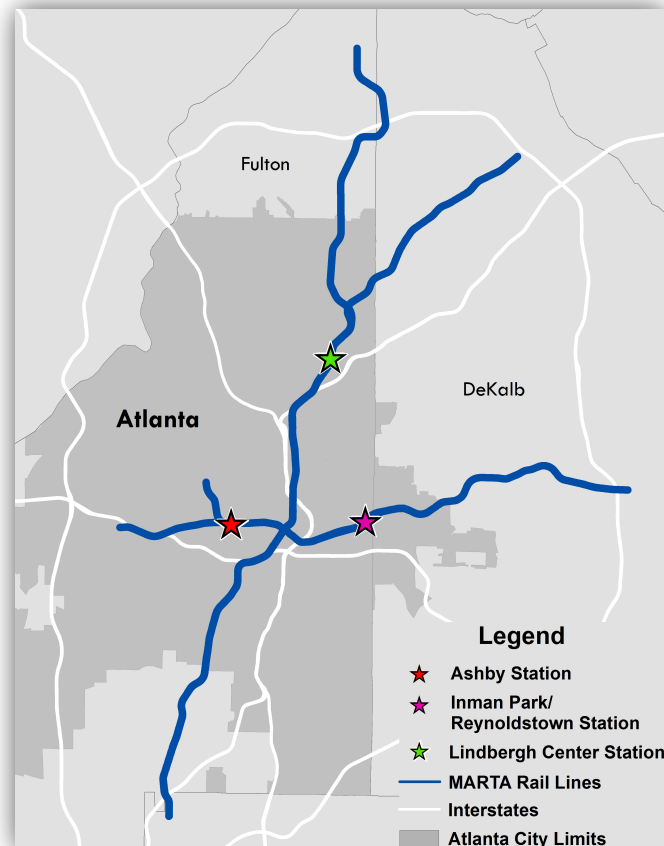


Figure 8: Case Study Station Locations
(Source: Author's own image)

along the Blue and Green lines. This station serves the Inman Park and Reynoldstown neighborhoods as well as nearby Krog City Market and Little Five Points. The final station is Lindbergh Center Station, which lies on the Red and Gold lines and is situated as the sixth stop north of Five Points Station between the Buckhead and Midtown neighborhoods. This station serves the current Transit-Oriented Development (TOD) site of Lindbergh City Center as well as being adjacent to the MARTA headquarters that lies along Piedmont Road.

Ashby Station

According to the MARTA Station Profile of Ashby Station, Ashby is considered a “Neighborhood” station, meaning it is located in an area that is primarily residential and the station is mainly meant to be a means for people to get to work and places of recreation. As of 2010, the daily entries are 2,100 people. The parking capacity is listed at 142 and parking utilization is at 18%, which is currently incorrect and will be discussed further momentarily. The population within a half-mile aerial radius of the station as of 2011 is 5,558 people, with a median age of 24.7 and a median household income of \$17,032. The area's population is over 90% African-American. There are 608 businesses within the half-mile aerial radius that employ 6,689 people. The unemployment rate in this area as of 2010 was 28.3%. Ashby Station lies at the intersection of Martin Luther King Jr. Drive and Joseph E. Lowery Boulevard (Ashby Station Profile 2012). It is the closest station to the Atlanta University Center, home to multiple historically black college and universities. Though mostly single family residential, there is some multi-family mixed use developments built nearby the station, including one that was recently built upon land that was purchased from MARTA adjacent to station property. A Wal-Mart shopping center has also recently been built on purchased property to the southeast of the station. MARTA currently owns 1.6 acres of parking lot directly to the west of the station that it has shut down to cars. The lot currently stands empty with the gates locked shut.

The pedestrian infrastructure surrounding this station is poor at best. On the MARTA station profile, it is listed as having a “Walk Score” of 57, which is classified as “somewhat walkable”. Sidewalks are present but not wide and most appear to be in a poor state of

disrepair. Potholes are prevalent on the streets and there is a clear lack of adequate crossing locations in place for pedestrians. Lighting is fair and there is some tree cover. Joseph E. Lowery Boulevard currently has bicycle sharrows painted onto the roadways but there is no shoulder whatsoever. Signage for the station is minimal. Currently there is an entrance to the station on the western side of Lowery that appears to have been abandoned and chained off, forcing all users to use the small entrance on the eastern side that has very few entrance gates. No bicycle parking appears to be available. The sidewalks lead off in all directions but no pedestrian signage appears to be installed that could point people who leave the station on foot in the appropriate direction of the AUC or the Westside Village.

The existing sidewalk network surrounding the station is fair to poor at best. There are existing sidewalks along most of the main roadways leading out the station but many abruptly end, become extremely narrow, or are in extreme disrepair. The observed state would not be welcoming to most who would chose or be forced to walk to their destination away from the station.

MARTA buses do come and go from the station but their bus bays are not in the best repair or physical state. Lighting is poor and signage is rare. Currently only one route (68) serves the station and moves south towards West End. No line currently makes its way north up Joseph E. Lowery Blvd away from the station, leaving a gap in the transportation network.

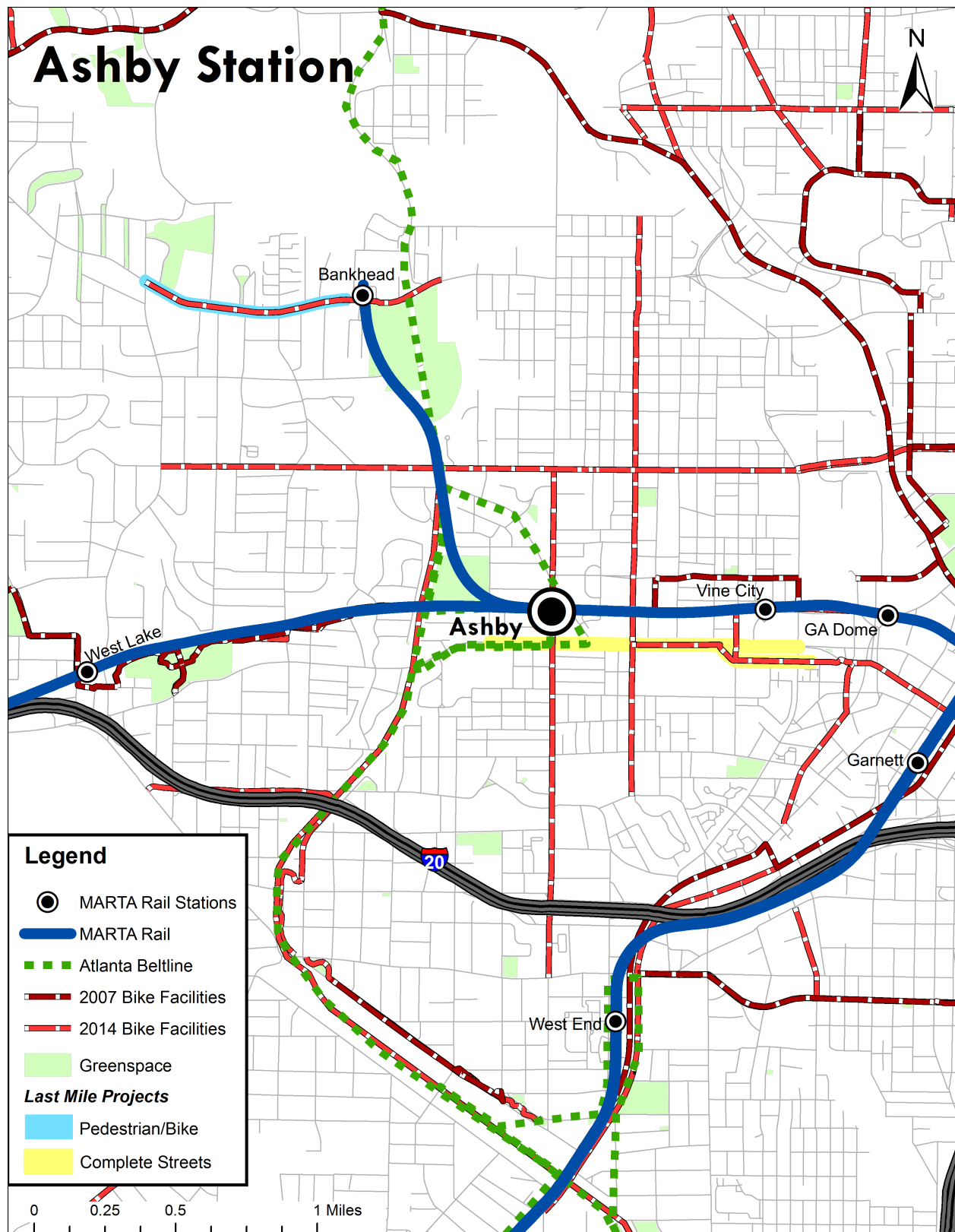


Figure 9: Ashby Station Neighborhood Overview (Source: Author's own image)

Inman Park/Reynoldstown Station

According to the Inman Park/Reynoldstown Station Profile provided by MARTA, this station is at-grade and is considered a “neighborhood” station surrounded by mostly residential neighborhoods and small businesses. As of 2010, the daily ridership of this station is 3,021 people. There are 401 available parking spaces with a stated parking utilization rate of 61%. The population within a half-mile from the station as of 2011 is 5,279 people. The median age is 34.9 with an annual median household income level of \$66,645. There are 916 businesses located within that half-mile aerial radius that employ 6,627 people and as of 2011, the area had an unemployment rate of 12.0%. Approximately 60% of the surrounding land is residential consisting of mostly single-family style homes. There are some multi-family developments currently on the southern side of the station. The two large parking lots at this station are currently heavily utilized and remain open at this time to drivers and long-term airport parking.

The pedestrian infrastructure at this station is clearly better suited for pedestrians and bikers and better maintained than at Ashby Station. Though the sidewalks on surrounding streets are still fairly narrow, the existence of potholes and poor sidewalk conditions is much less prevalent. Although the station itself lies along DeKalb Avenue, the parallel street of Edgewood Avenue is currently wide, has good sidewalks, and is equipped with dedicated bike lanes on either side of the road for easy access to downtown and the surrounding neighborhoods. Lighting is ample and tree cover is fairly consistent. A raised pedestrian walkway connects the station to both sides of DeKalb Avenue, which leads to a safer and more

comfortable walking experience. Thirty-six bicycle parking spaces currently are installed at the station.

The existing sidewalk network around this station is somewhat improved over that observed at the Ashby Station. They appear to be better maintained with less awkward dead ends and cracks. The main issues are the widths. Most appear to be very narrow, some borderline not up to ADA (Americans with Disabilities Act) standards. Placement of trees and electrical poles in the middle of the sidewalk only furthers this issue as pedestrians or those in mobility vehicles have to swerve or sometimes completely exit the sidewalk in order to pass.

Inman Park Station is currently served by four MARTA bus routes (4, 24, 107). These routes

exit the bus bay and all head east before turning north or south along Moreland Avenue. This dispersion makes sense as the station is one of several stations along the Blue/Green lines that are headed east and west in succession.



Figure 10: Ashby Station Pedestrian Bridge
(Source: Author's own image)

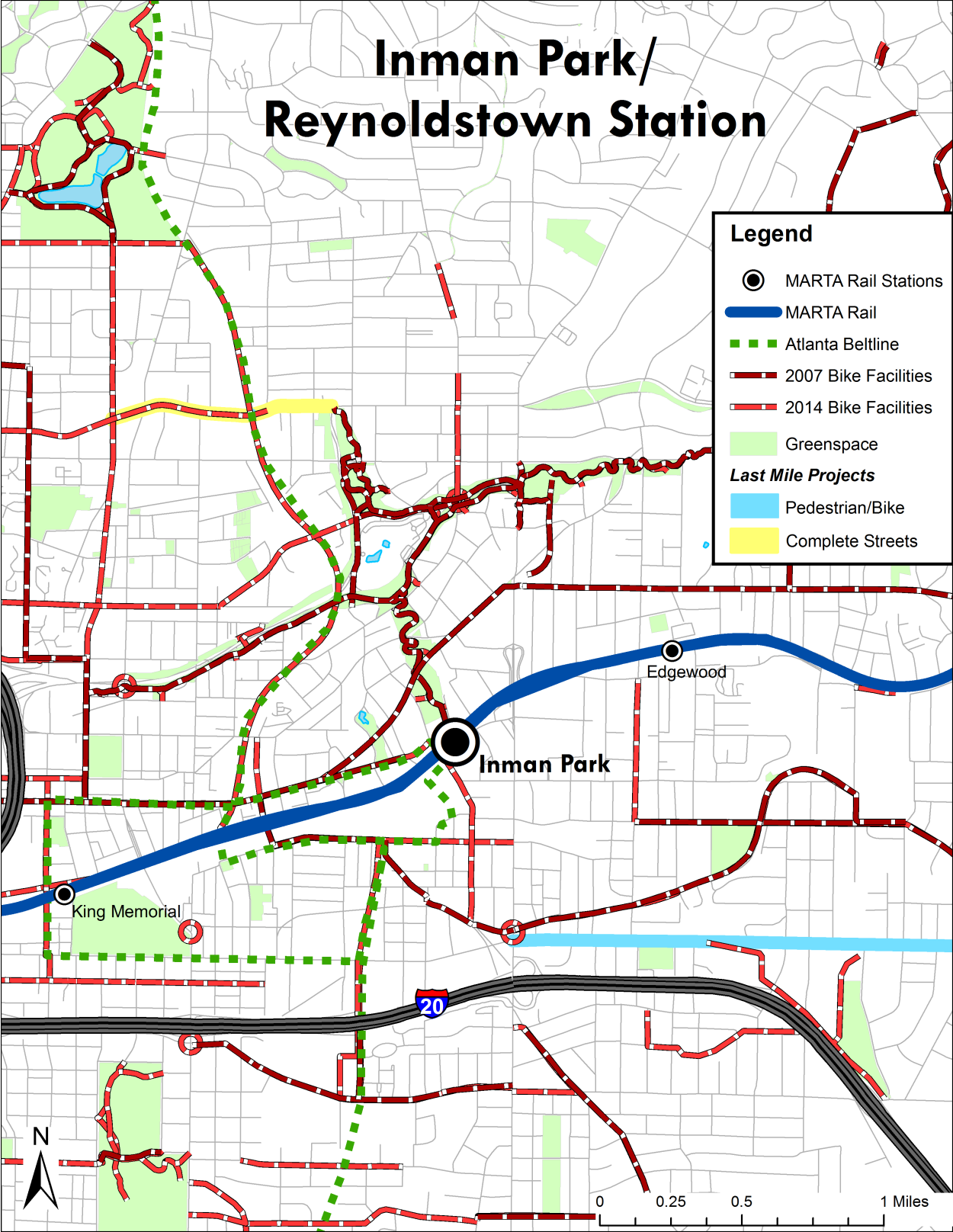


Figure 11: Inman Park/Reynoldstown Neighborhood Profile (Source: Author's own image)

Lindbergh Center Station

According to the Lindbergh City Center Station profile provided by MARTA, this station is classified as a “Commuter Town Center” station, which means this station is viewed as both a collector station, which is one that allows users to walk, bike, or park at the station and then board to ride to another location, as well as a one that serves as a town center station which serves as an anchor to a mixed-use transit oriented development. As of 2011, Lindbergh had an average daily ridership of 8,981 users. The adjacent parking decks provide 2,519 parking spaces. There are approximately 7,640 people living within an areal half-mile radius to the station with a median age of 31, median household income of \$69,721, and over one thousand businesses within one-mile of the city center. There is a healthy mixture of both commercial and residential land uses surrounding the station, lending itself to really be utilized as a mixed-use transit oriented development if properly implemented and maintained.

The pedestrian infrastructure directly around Lindbergh is excellent compared to other stations of similar size and ridership level on the MARTA rail system. Sidewalks are wide and plentiful lined with plenty of trees and greenery along with abundant lighting. Sidewalks are well maintained and lead off in all directions towards other businesses, Piedmont Road, and to other residential neighborhoods nearby. There are five different access points where entrance gates are located that one can enter into the station allowing for easier access from all sides. Once away from the station however, the infrastructure declines in quality somewhat. Sidewalks narrow, lighting becomes more sparse, and bicycle lanes are virtually non-existent. Pedestrian crossings over Piedmont Road directly to the east of the station is extremely uncomfortable with long blocks and poor sidewalk

maintenance, leading to an increase in observed jaywalking incidents. Some bicycle parking is available but most is located away from the station inside parking decks.

Five bus routes currently serve Lindbergh Center. The number 5 runs up Piedmont Road to Sandy Springs, the number 6 runs to Emory, the number 27 to Cheshire Bridge and Ansley Mall, the 30 to LaVista Road, and the 39 up Buford Highway to Doraville Station. (Lindbergh Center Station Profile 2012)



Figure 12: Lindbergh Station Entrance (Source: Author's own image)

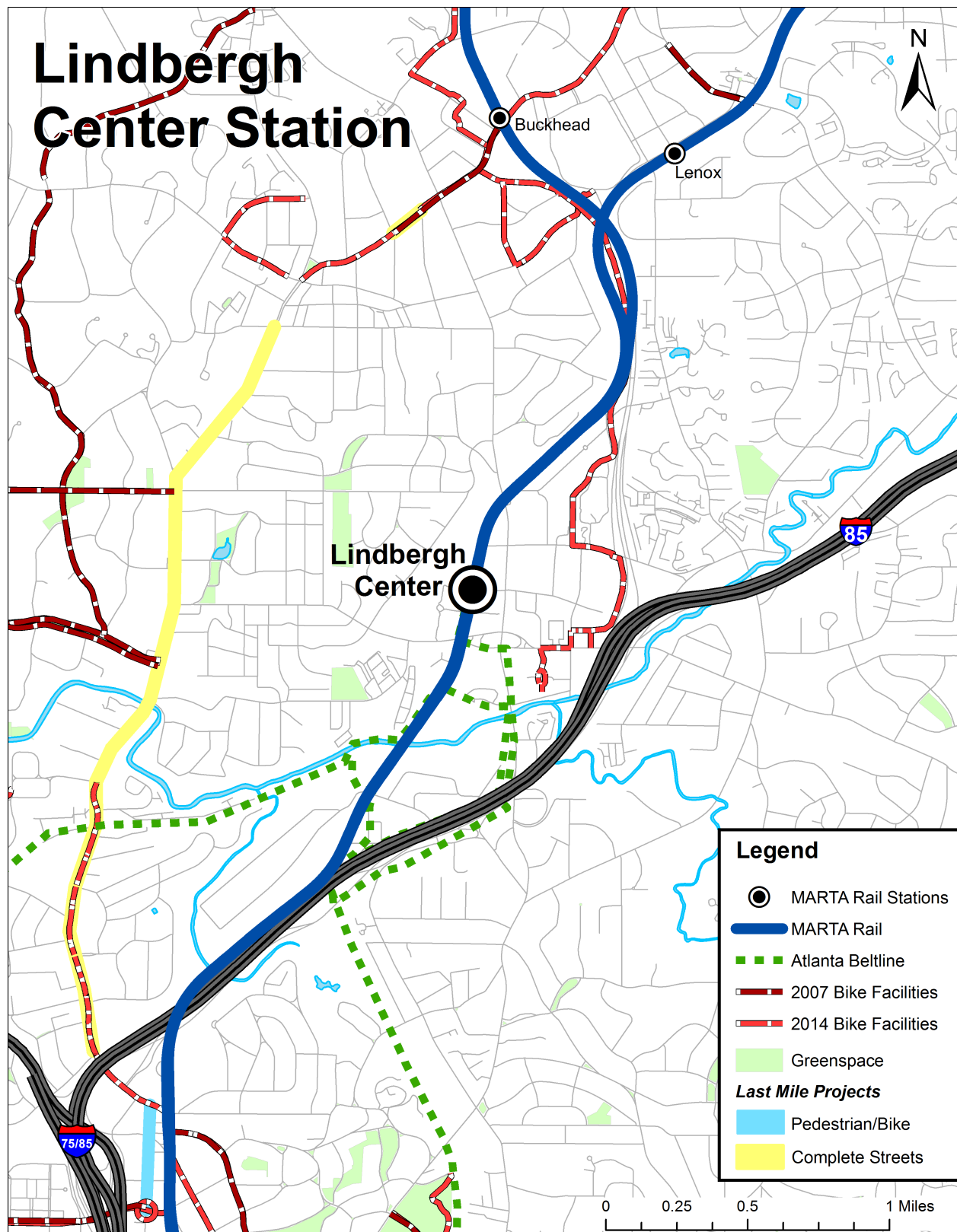


Figure 13: Lindbergh City Center Neighborhood Profile (Source: Author's own image)

Network Analysis

When evaluating access to a transit station, physical design is not the only key component that must be highlighted. Socioeconomic characteristics should be carefully gathered to see who is using the station, what sort of background they have, whether or not they are considered a “captive” rider or not (one whose only means of travel is by public transportation), and how that station is serving those who have to walk or bike to that particular station (as they may not own a car). Often this information is usually displayed by transit agencies in a manner that states the demographics of the residents surrounding the station within either a half-mile or mile radius. These radii are drawn from the center of the station where a circle is drawn by air. Although these measurements of demographic statistics are helpful in a quick look or explanation, they may not always be accurate representations of who actually lives within a half-mile or mile of the station. Where some measurements are made by air, or “as the crow flies” distance from the station, that is not the reality of how people come and go from any location. When walking, biking, or driving to a station, people reach that destination by using the existing network of roads, sidewalks, or trails available to them. Often times there are physical barriers such as an interstate, railroad line, or building to where anyone on foot or bike could not actually access that station from certain sides or angles. The following show not only a mile radius around each station by air but also a half-mile or mile network radius using the existing pedestrian infrastructure and roadways. This was accomplished running a network

analysis around each station using existing roadway and path data to determine points of access in ArcGIS, a commonly used program for mapping data sources.

Ashby Network Analysis

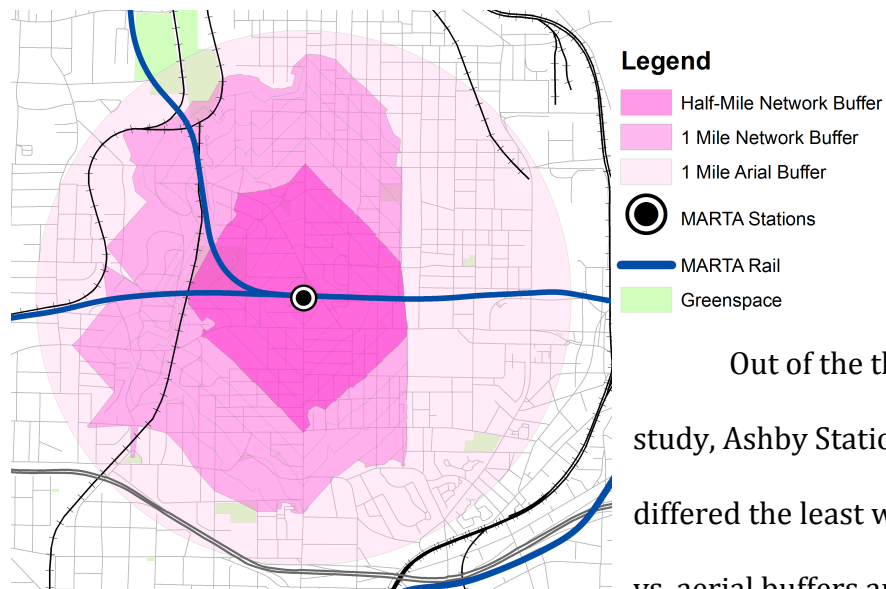


Figure 14: Ashby Buffers Map
(Source: Author's own image)

Out of the three stations in this case study, Ashby Station yielded the results that differed the least when comparing network vs. aerial buffers and access points. As seen in Figure 14 to the left, the darkest of pink

represents the half-mile network buffer, with the lighter pink being the mile-network buffer, and the lightest of pink being the one-mile aerial buffer. Both network buffers radiate fairly equally from the station, indicating that there are no major barriers of access from any direction (the truncation along the eastern edge of the buffers is present because they edge up to the buffers coming from the Vine City Station to the east). This finding however may be the most frustrating of the three stations because, based upon the network analysis. Ashby should be the easiest station to access yet has the worst pedestrian and bicycle infrastructure. This is unacceptable, especially since the population around this station is in need of public transportation the most.

Inman Park Network Analysis

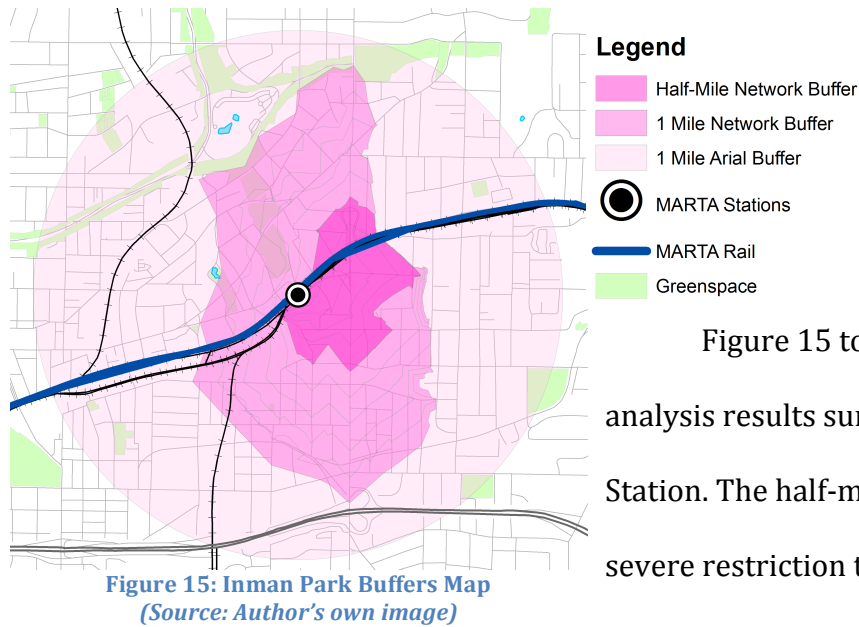


Figure 15 to the left shows the network analysis results surrounding the Inman Park Station. The half-mile network buffer reveals severe restriction to the station from the northern and western edges while the 1 mile network buffer allows for more movement into the station from the northern and southern portions of the aerial buffer. One reason for this is that the industrial rail lines that run through Downtown are passing through the neighborhood at-grade with the roadway, which creates a massive pedestrian barrier. Luckily Inman Park has implemented pedestrian bridges over the railways and roadways to help with this connection, but there appears to still be some problem getting in and out of the station from certain neighborhoods.

Lindbergh Network Analysis

Lastly, Lindbergh Center Station shows some similar problems of access by the pedestrian and roadway networks due to similar barriers seen at Inman Park. A freight rail line runs directly to the west of the City Center creating a massive barrier of passage

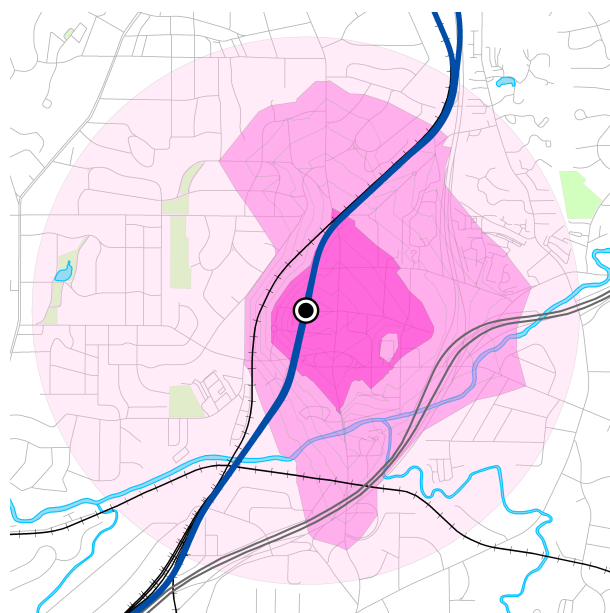


Figure 16: Lindbergh Center Buffers Map
(Source: Author's own image)

Legend

- Half-Mile Network Buffer
- 1 Mile Network Buffer
- 1 Mile Aerial Buffer
- MARTA Stations
- MARTA Rail
- Greenspace

between the station and the neighborhoods to the west. This creates the shape of the half-mile network buffer where only residents to the north and the east of the station can actually access the station within half a mile walk or bike ride. The one-mile network stretches a little farther to the east than the half-mile buffer but not by much. This analysis shows that there

needs to be better connectivity to the station from the west, perhaps by pedestrian bridge or tunnel to bypass the freight rail lines.

Socioeconomic Findings

The above findings show that aerial buffers do differ greatly surrounding certain stations than those creating using network analysis buffers. Using the above data, the socioeconomic characteristics were pulled from the 2010 United States Census as well as from the 2010-2014 American Community Survey for each station using the half-mile and one-mile aerial buffers as well as the half-mile and one-mile network created buffers.

Ashby 2010 US Census & 2010-2014 ACS Data								
	1/2 Mile Aerial		1/2 Mile Network		1 Mile Aerial		1 Mile Network	
	#	%	#	%	#	%	#	%
Race								
White	912	9.5%	912	9.5%	1,542	9.0%	1,533	9.2%
Black	7,740	81.0%	7,740	81.0%	14,547	84.5%	13,931	84.0%
Hispanic	377	3.9%	377	3.9%	453	2.6%	453	2.7%
Asian	319	3.3%	319	3.3%	400	2.3%	397	2.4%
Other	209	2.2%	209	2.2%	277	1.6%	272	1.6%
total:	9,557	100%	9,557	100%	17,219	100%	16,586	100%
Income								
Median Household Income	\$ 23,289		\$ 23,289		\$ 23,076		\$ 23,174	
Commute								
Drive	1,517	50.4%	1,517	50.4%	3,116	58.4%	2,968	57.6%
Transit	666	22.1%	666	22.1%	929	17.4%	907	17.6%
Bike	-	0.0%	-	0.0%	-	0.0%	-	0.0%
Walk	504	16.8%	504	16.8%	760	14.2%	760	14.7%

Table 1: Ashby Buffers Demographic Data Table (Source: Author's own image)

Table 1 shows the data obtained that correspond to the block groups that intersected the buffers around Ashby Station. The first thing that is noticeable is that the block groups that intersected the buffers for the half-mile buffers were the same, generating the same data. This is not surprising as Ashby is the station that showed the fewest differences between the network and aerial buffers. From the data, it is clear that Ashby lies in a predominately African-American neighborhood. This neighborhood suffers from low median household income levels, which may be the reason why the percentage of people who take public transit to work is above 15%, high for the Atlanta region. Walking is also a higher than average percentage of commuting while bicycling was reported as zero, which is more than likely incorrect.

Inman Park/Reynoldstown 2010 US Census & 2010-2014 ACS Data								
	1/2 Mile Aerial		1/2 Mile Network		1 Mile Aerial		1 Mile Network	
	#	%	#	%	#	%	#	%
Race								
White	7,514	58.2%	2,748	61.9%	15,390	59.4%	11,148	61.0%
Black	3,974	30.8%	1,114	25.1%	7,725	29.8%	5,168	28.3%
Hispanic	654	5.1%	336	7.6%	1,236	4.8%	909	5.0%
Asian	311	2.4%	97	2.2%	816	3.1%	543	3.0%
Other	460	3.6%	148	3.3%	741	2.9%	519	2.8%
total:	12,913	100%	4,443	100%	25,908	100%	18,287	100%
Income								
Median Household Income	\$ 63,393		\$ 68,544		\$ 63,087		\$ 65,715	
Commute								
Drive	6,681	78.7%	1,983	75.0%	13,570	79.9%	9,516	80.3%
Transit	612	7.2%	242	9.2%	1,039	6.1%	825	7.0%
Bike	217	2.6%	112	4.2%	341	2.0%	248	2.1%
Walk	206	2.4%	53	2.0%	543	3.2%	228	1.9%

Table 2: Inman Park Buffers Demographic Data Table (Source: Author's own image)

The next station in the study is Inman Park. Table 2 breaks down the findings of the demographic data for this area. The first key find is that the population in the network created half-mile buffer is a third of the population within the aerial buffer, showing that not nearly the amount of people that MARTA may state can access the station in under a half-mile can actually achieve that. This area appears to be more white dominated along with a median household income almost three times that of Ashby. The automobile dominates the commute mode share, although still around 10% to 12% use public transportation, biking, or walking as their means of arrival to work.

Lindbergh City Center 2010 US Census & 2010-2014 ACS Data								
	1/2 Mile Aerial		1/2 Mile Network		1 Mile Aerial		1 Mile Network	
	#	%	#	%	#	%	#	%
Race								
White	7,615	55.0%	3,619	49.3%	16,263	58.6%	10,930	56.6%
Black	2,252	16.3%	1,213	16.5%	4,626	16.7%	3,463	17.9%
Hispanic	2,470	17.8%	1,852	25.2%	4,518	16.3%	3,124	16.2%
Asian	1,020	7.4%	499	6.8%	1,736	6.3%	1,342	6.9%
Other	496	3.6%	152	2.1%	607	2.2%	451	2.3%
total:	13,853	100%	7,335	100%	27,750	100%	19,310	100%
Income								
Median Household Income	\$ 76,794		\$ 80,431		\$ 79,945		\$ 68,311	
Commute								
Drive	7,349	82.6%	4,307	78.0%	14,118	76.8%	10,643	81.4%
Transit	696	7.8%	625	11.3%	1,544	8.4%	1,174	9.0%
Bike	-	0.0%	-	0.0%	53	0.3%	10	0.1%
Walk	254	2.9%	216	3.9%	407	2.2%	360	2.8%

Table 3: Lindbergh Buffers Demographic Data Table (Source: Author's own image)

Lastly, the demographics from the buffers surrounding the Lindbergh Center Station are highlighted in Table 3. The block groups surrounding Lindbergh are majority white but with large percentages of both African-Americans and Hispanics within the buffers. As with Inman Park, the population numbers do change fairly drastically between the aerial and network created buffers but with not much difference between income levels and racial backgrounds. Transit ridership does go up almost 4% between the half-mile aerial and half-mile network buffers, suggesting that those who live within an actual half-mile of the station by walking or bicycle tend to take the train or bus more so than those who do not.

Recommendations

The following are recommendations of amenities and infrastructure that could be implemented in and around the three MARTA stations in this case study that would greatly improve the overall pedestrian experience and access.

Station Improvements

Pedestrian Improvements

The first area of improvement for stations comes from those that directly affect pedestrians on foot who are accessing the station from the neighborhoods surrounding it. The first improvement is that sidewalks should be connected to neighborhoods in all direction from each station along both sides of the roadway when available. Sidewalks should be well maintained and wide enough for multiple users to utilize the pathway at a time. This is a challenge in the city of Atlanta as sidewalks are currently the property owner's responsibility to maintain, not the city. This has led to a decrepit sidewalk network surrounding most MARTA stations. When possible, these pathways should also be created in as much of a grid-like pattern as possible, easing the connectivity between two locations. This can also be a challenge in Atlanta, especially in more suburban area station neighborhoods where grid-like patterns are virtually non-existent. Although a sidewalk is important, it is not the only important aspect of a walk to and from a station.

Proper lighting is important for safety, comfort, and equity (many must use public transit during periods of darkness for work). Many lights surrounding stations are blown

out or poorly spaced. They should be placed where proper lighting is created, preferably using LED technology for lower energy usage and maintenance costs. Shade and greenery should also be in place. Trees are not only good for our air quality but they also provide proper shade in the hot months of the year along with contributing to a much more pleasant pedestrian experience in and around the stations. Green space is also important as it is not only aesthetically pleasing (more so than concrete walls or parking lots) but because they provide areas for people to congregate and enjoy the outdoors while waiting on a transit connectivity or on a friend to meet up with them to board the train.

Proper sidewalk and crossing infrastructure should also be in place around each station to create an easier environment to and from the station entrances. Hawk signal priority crossings like the one to the right (Image of Hawk Signal n.d.) are one way that pedestrians can more easily cross a busy multi-lane roadway, such as Piedmont Road outside of



Figure 17: Hawk Eye Signal Crossing
(Source: Ada County Highway District)

as Piedmont Road outside of Lindbergh Center. Signal prioritization should be given to pedestrians in realistic quantities and mid-block crossings where jaywalking is occurring should be studied and remedied.

Lastly, signage is a key ingredient to making a good pedestrian environment great. Many users are from out of town or are not familiar with the system or neighborhood where the station is located. Signage directing them towards major roadways, buildings, or activity centers should be prevalent in and throughout the exterior of the station.

Pedestrian maps of the Lindbergh City Center Station are in full display at entrances to the

station and highlight surrounding building and retail locations. Often referred to as wayfinding, this method of visually displaying information is helpful to many passengers and can create a much more smooth transition from the station to the surrounding businesses and neighborhoods.

Bicycle Improvements

The second area of improvement around stations is in the realm of bicycle facilities, storage, and access. MARTA is well known as being a bicycle friendly transit service with spaces for bicycle storage clearly marked on trains and bike racks installed on the front of its bus fleet. This is great for those who would like to ride their bike to a station, ride the train to the other side of the city, and then take their bike with them to another location.

However, sometimes the bicycle is not needed on one end of the trip so the traveler has to store their bike at the station itself. Many stations however lack proper bicycle parking spaces or racks. Ashby appears to only have one or two racks, with Inman Park having a few more spaces, and Lindbergh Center having the most. The locations of these racks however could be improved. Racks should be located as close to entrance and exit points as possible under a covered, well lit public space to reduce damage to or theft of the bicycle while it is parked.

Along with more racks, proper signage alerting the commuter of their locations and safety alerts (use a U-lock for improved safety, for example) should be easily seen. Bike racks should also be located at each entrance, not just one. Make it as easy as possible for someone to ride up, park their bike, and run to a train in a hurry.



Figure 18: Bicycle signage at Lindbergh Station
(Source: Author's own image)

Wherever possible, MARTA should work with the city to ensure that bicycle facilities exist within the roadways leading to and from each station. Sharrows painted on a roadway are better than nothing (as they can alert the driver of a vehicle to be mindful of the possibility of bicyclists within the corridor), but their advantages are minimal if there is no room for a bike and a car to both use the same lane. Bike lanes or separated bicycle tracks are beginning to be installed throughout certain heavily traveled corridors and roadways within the city and this trend needs to continue outward to these stations in question. Bicycle connectivity via bikeways and dedicated lanes are important because of the safety concerns many have



Figure 19: Example of wide bike lanes and plentiful parking
(Source: *Street blogs*)

when taking a bike in a crowded roadway. One would generally be more willing to try biking if they had their own lane or some sort of buffer between them and a car. Bicycle connectivity is increasingly important when a station is located near an activity center or a college or university, such as Ashby. The Atlanta University Center is only a few short blocks away and should be connected with easily accessible bike lanes for easy access.

Complete Streets

Another improvement that could impact pedestrian and bicycle traffic is the concept of a complete street design being implemented along roadways surrounding the stations in this study. Complete

street design is the idea that streets should not only be for private motor vehicles but also for all other modes of traffic and movement. This includes walking

pedestrians, bicyclists,

wheelchairs, scooters, and buses.

With this mindset, streets are designed to be more comfortable for all, including cars. Street calming measures, lane diets, and roundabout installation can lead to a better experience overall for everyone. Certain roadways surrounding the study stations have been analyzed and hypothetical designs have been created using the design formatting available on a website called Street Mix which is powered by Code for America. They are intended to highlight how each roadway section can better integrate all modes of travel, not just the car.



Figure 20: A Complete Street design concept
(Source: Crandall Arambula 2015)

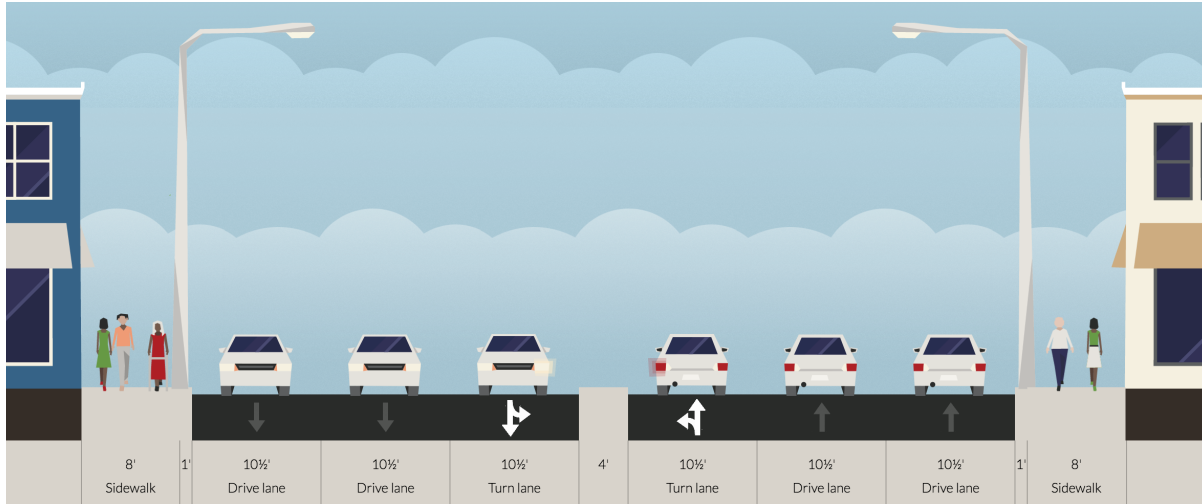


Figure 21: Piedmont Road- Existing (Source: Author's own image)

Above is a section of Piedmont Road that is typical outside of the Lindbergh City Center. Six lanes of traffic, three in each direction, are the current make up. There are virtually no turn lanes causing the left lane to be the de-facto turn lane, leading to congestion and traffic weaving problems. There is a small raised barrier between the lanes. Tall, industrial lighting currently exists along with very limited tree coverage. No bicycle facilities currently exist.

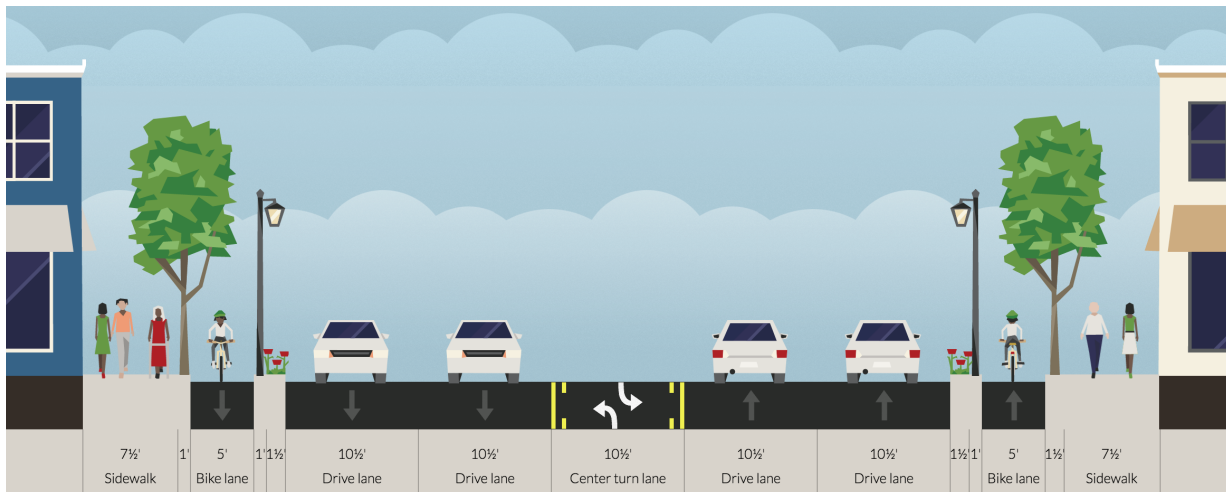


Figure 22: Piedmont Road- Proposed (Source: Author's own image)

Above is a reimagined cross-street view of Piedmont Road in the same location. Two lanes of traffic are removed and a turn lane is installed for both directions to use. Where no turns

are needed or are too dangerous, a grass median (preferably with trees) will be installed. With the extra space, a separated bicycle track will be installed in both directions. Better lighting will be installed along both sides, lighting not only the roadway but also the bicycle path and sidewalks. Trees and flowers will be installed in the medians and along the edges of the roadways for better shade and greenery benefits. Wider sidewalks will be installed with the remaining space along with benches, trashcans, and signage pointing to the areas of entry into the City Center.

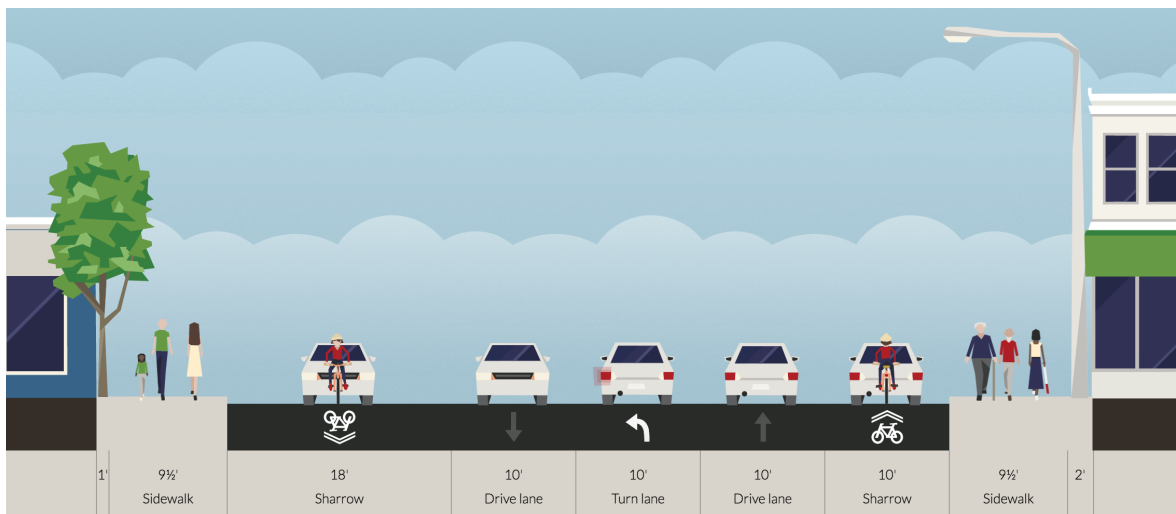


Figure 23: Joseph E. Lowery Blvd – Existing (Source: Author's own image)

Figure 23 above shows the current configuration of roadway along Joseph E. Lowery Boulevard as it bisects the Ashby Station entrances. Two wide lanes of travel run in each direction with a turn lane in the middle. An extremely wide lane running south on the left side of the illustration currently exists in front of the station entrance. Sharrows are painted on the outside lanes of travel. Very little pedestrian infrastructure exists, such as benches and trashcans, and tree coverage is limited.

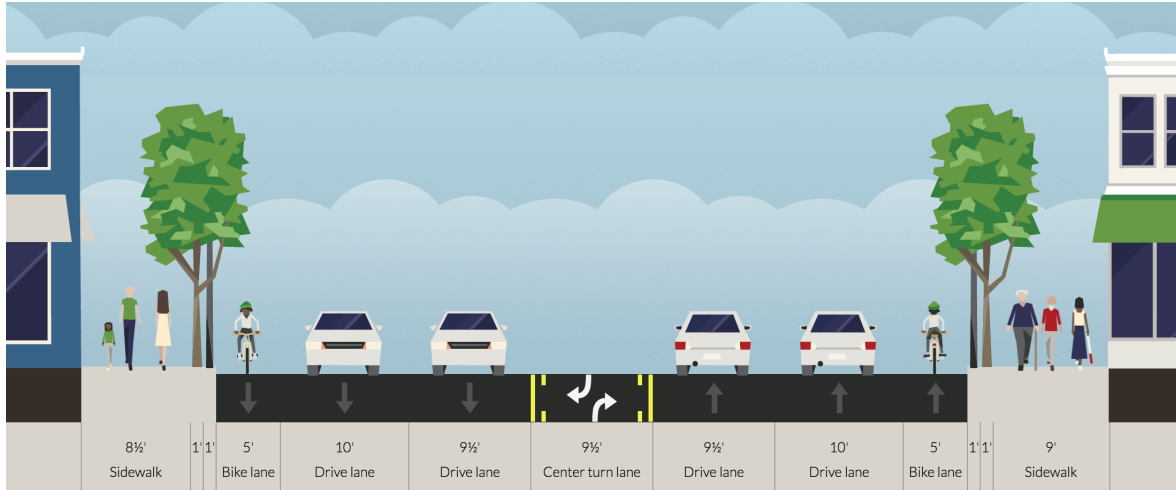


Figure 24: Joseph E. Lowery – Proposed (Source: Author's own image)

Above is a reimagined view of what Joseph E Lowery Blvd at the same section as above could look like. Lane sizes are shrunk, slowing traffic. A center turn lane is installed for cars to easily come in and out of businesses that have sprung up outside of the station.

Sidewalks are approximately 10 feet wide with ample space for lighting and trees to be planted. Five feet bike lanes are installed along the outer edges of the roadway, allowing for easier access to and from the Ashby Station to points of interest nearby, such as the AUC.

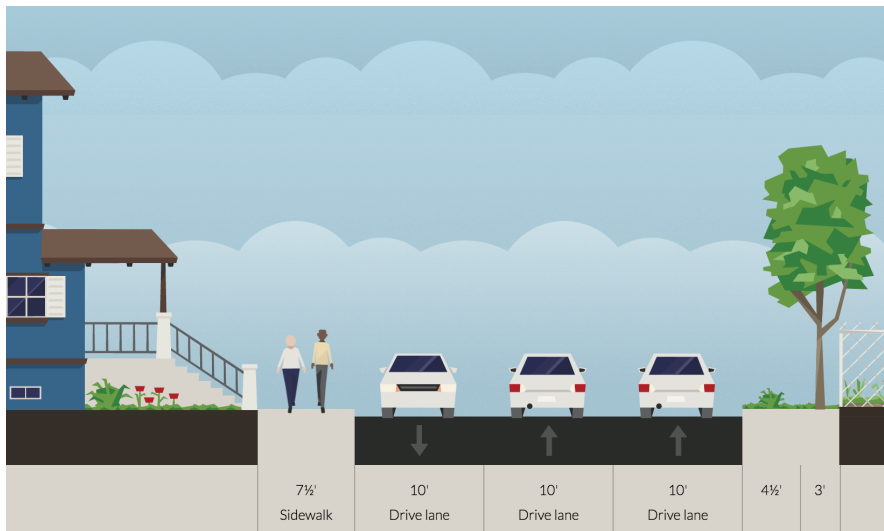


Figure 25: DeKalb Ave – Existing (Source: Author's own image)

The above street section is of DeKalb Avenue near the Inman Park/Reynoldstown Station.

Currently the roadway consists of three lanes with the center lane being reversible for

relieving congestion during peak travel times. A small sidewalk exists along the northern edge of the roadway with limited tree coverage or pedestrian amenities. An unused grassy space with no sidewalk exists on the southern edge of the roadway, separating the road from the rail tracks.

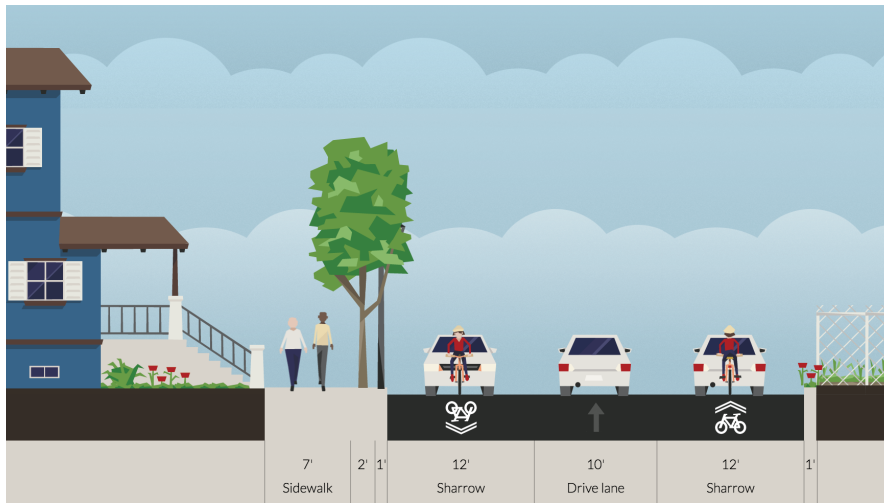


Figure 26: DeKalb Ave – Proposed (Source: Author's own image)

Above shows what DeKalb Avenue could look like if reimagined and redone to increase the pedestrian experience. Lanes of travel are shifted completely to the south to be up against the walls that separate the corridor from the rail lines. This allows for more room on the sidewalks to the north and for wider lanes to be created in order to allow more room for bicyclists since there is unfortunately not enough room for dedicated bike lanes. Trees and greenery are installed to separate the sidewalk from the roadway along with more aesthetically pleasing lighting. This also allows for a more pedestrian friendly access to houses and businesses located along this stretch of roadway.

Funding Measures

All of these improvements, though extremely useful, necessary, and worthwhile, do cost money to build, which is something that MARTA has not always had excess of, especially in recent years. With MARTA's funding difficulties and the limiting of funds due to the recent economic downturn that the region is still recovering from, funding sources for these types of projects must be found. Many federal programs exist to aid in the building of both public transit and towards the pedestrian access to that transit, such as Moving Ahead for Progress in the 21st Century (MAP 21), Transportation Alternatives Program, and the Surface Transportation Program, all of which have some bike/pedestrian components that can be spun towards funding these types of projects. Next comes funding from states, which is something that is hard to come by currently in the state of Georgia. However, Georgia does have some funds that could be channeled towards improving pedestrian improvements, such as portions of the gas tax, licensing fees, impact fees, and local planning assistance grants. Lastly, local funds can be generated using tax allocation districts (such as Midtown Alliance, Buckhead Improvement District, etc.) as well as cities implementing tax increment financing (TIF). Many of these measures are helped spurred into action by local committees and groups, such as Bike Atlanta, who advocate for these pedestrian improvements by lobbying their local officials, holding public meetings, and educating the public about these issues. If utilized properly, these local groups can generate real action in their respective communities.



Source: Buckhead CID 2015

Final Conclusions

Pedestrian and bicycle access to transit stations is an important factor that contributes to the overall usage of the transit system. It is a key ingredient if the system wants to be a fully functional environmentally friendly system that encourages walkability and reduces the use of the private vehicle. In order for this to occur, the pedestrian environment needs to be one of a positive, pleasant experience. The three MARTA Stations highlighted in this case study presented some interesting issues regarding this pedestrian experience.

Current projects and existing infrastructure should be considered when looking into any improvement plan, as it is usually best practice in the planning world to build upon what already exists and make it better. Ashby Station is sitting upon a fantastic street grid that allows access to numerous neighborhoods, community centers, and universities nearby. The station however suffers from poor sidewalk condition and connectivity, limited retail nearby, poor bicycle infrastructure, and an underutilized abandoned parking lot. The potential is there to completely transform that site and make it a vibrant transit oriented neighborhood station. Inman Park is situated in a neighborhood of higher wealth and resources along with adequate bicycle connectivity toward Downtown but suffers from poor sidewalk connectivity, lighting, and use of its public space surrounding the station. It has the opportunity to expand its bicycle facilities, install open green space for gatherings and recreation, and serve as an excellent alternative for transportation from its neighborhood to Downtown and the airport. Lindbergh Center Station is the best equipped station in this study for pedestrian access within the city center but suffers from poor connectivity to surrounding neighborhoods as well as limited pedestrian infrastructure

across major roadways surrounding it. It has the potential to further build upon its transit-oriented development design and become a true neighborhood transit hub in the future for the entire Lindbergh area.

The purpose of this study was to identify the potentials that each of these three stations has going forward as MARTA strives to expand its ridership numbers and overall experience. These stations are built and fully functional and are close to being truly great transportation hubs for their respective neighborhoods. Small changes can be made that could truly impact thousands of residents. Many people want to be able to move more freely from their homes to their jobs and places of recreation- we just have to make sure public transportation can fit that need in a way that is aesthetically and environmentally friendly. MARTA has the potential to be an excellent transit service; it just needs to take a few more steps to get there.



Figure 27: Lindbergh City Center
(Source: Author's own image)

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